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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,859	03/15/2004	Takeo Tsukamoto	03500.015727.1	7003
5514	7590	08/15/2005	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			HINES, ANNE M	
			ART UNIT	PAPER NUMBER
			2879	
DATE MAILED: 08/15/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/799,859

Applicant(s)

TSUKAMOTO, TAKEO

Examiner

Anne M. Hines

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-60 is/are rejected.
- 7) ☒ Claim(s) 43, 49 and 55 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/15/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment filed on April 7, 2005 has been entered and acknowledged by the Examiner.

Claims 40-60 are pending in the instant application.

Information Disclosure Statement

The information disclosure statement filed March 15, 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. The following non-patent literature publication has not been submitted: H. Dai et al., "Nanotubes as Nanoprobes in Scanning Probe Microscopy," Nature, Vol. 384, 147-150 (1996). The examiner has not considered this reference.

Claim Objections

Claims 43, 49, and 55 are objected to because of the following informalities: the phrase "the carbon fibers are formed to have ends distant from a surface of the second electrode" is indefinite due to the word distant. Appropriate correction is required.

Double Patenting

Applicant is advised that should claim 40 be found allowable, claims 52 and 58 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Additionally, should any of dependant claims 41, 42, 43, 44, and 45 be found allowable, corresponding dependant claims 53, 54, 55, 56, and 57 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Also, should dependant claims 44 and 45 be found allowable, corresponding dependant claims 59 and 60 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 40-60 are rejected under 35 U.S.C. 102(e) as being anticipated by Murakami et al (US 2002/0009637).

Regarding claims 40, 52, and 58, Murakami discloses a method of manufacturing an electron-emitting device, comprising the steps of: providing a substrate (Fig. 8B, 41) on which a first electrode (Fig. 8B, 42) and a second electrode (Fig. 8B, 44) are disposed; and arranging a plurality of carbon fibers on the first electrode (Page 6, Paragraph [0056]), wherein each carbon fiber has a plurality of graphenes (Page 3, Paragraph [0025]), which are stacked so as not to be parallel to an axis direction of each carbon fiber (Fig. 4, 21).

Regarding claim 46, Murakami discloses a method of manufacturing an electron-emitting device, comprising the steps of: providing a substrate (Fig. 8B, 41) on which a first electrode (Fig. 8B, 42) and a second electrode (Fig. 8B, 44) are disposed; and arranging a plurality of carbon fibers on the first electrode (Page 6, Paragraph [0056]), wherein each carbon fiber has a plurality of graphenes (Page 3, Paragraph [0025]), which are stacked so as not to be parallel to an axis direction of each carbon fiber (Fig. 4, 21).

Regarding claims 41, 47, and 53, Murakami discloses wherein the providing step includes processes of: arranging a plurality of catalyst particles so as to be connected to the first electrode; and growing the plurality of carbon fibers by a reaction between the plurality of catalyst particles and a gas containing carbon (Page 3, Paragraph [0026]).

Regarding claims 42, 48, and 54, Murakami discloses wherein the catalyst particles contain iron (Page 3, Paragraph [0026]).

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Regarding claims 43, 49, and 55, Murakami discloses wherein at least one or more of the carbon fibers are formed to have ends distant from a surface of the second electrode (Fig. 8b).

Regarding claims 44, 50, 56, and 59, Murakami discloses wherein an electron source is manufactured having a plurality of electron-emitting devices (Page 1, Paragraph [0001]).

Regarding claims 45, 51, 57, and 60, Murakami discloses wherein an image forming apparatus comprising a substrate having a third electrode and a phosphor, and an electron source disposed in opposition to and spaced from the substrate (Page 6, Paragraph [0057]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 40-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deguchi et al. (US Pat. No. 6,400,091) and Rodriguez et al. ("Catalytic Engineering of Carbon Nanostructures," *Langmuir* 11, pp. 3862-3866 [1995]).

Regarding claims 40, 52, and 58 Deguchi teaches a method of manufacturing an electron-emitting device, comprising the steps of: providing a substrate (Fig. 1A,11; Column 11, line 28) on which a first electrode (Fig. 1A,12; Column 11, line 28) and a

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second electrode (Fig. 1A,15; Column 11, lines 38-40) are disposed; and arranging a plurality of carbon fibers on the first electrode (Fig. 1A,14; Column 11, lines 28-29; Column 5, line 64 through Column 6, line 3), wherein each carbon fiber has a plurality of graphenes (Fig. 1A,14; Column 5, line 64 through Column 6, line 3). Deguchi fails to teach wherein the graphenes are stacked so as not to be parallel to an axis direction of each carbon fiber. Rodriguez teaches wherein the graphenes are stacked so as not to be parallel to an axis direction of each carbon fiber (Page 3864: "the graphite platelets are stacked ... perpendicular to the fiber axis") in order to have specific electrical properties (Page 3862). Therefore, it would have been obvious to one of ordinary skill in the art to modify the carbon fibers of Deguchi to have a graphene structure not parallel to an axis direction of each carbon fiber, as disclosed by Rodriguez, in order to have specific electrical properties.

Regarding claim 46, Deguchi a method of manufacturing an electron-emitting device, comprising the steps of: providing a substrate (Fig. 1A,11; Column 11, line 28) on which a first electrode (Fig. 1A,12; Column 11, line 28) and a second electrode (Fig. 1A,15; Column 11, lines 38-40) are disposed; and arranging a plurality of carbon fibers on the first electrode (Fig. 1A,14; Column 11, lines 28-29; Column 5, line 64 through Column 6, line 3), wherein each carbon fiber has a plurality of graphenes (Fig. 1A,14; Column 5, line 64 through Column 6, line 3). Deguchi fails to teach wherein the graphenes are stacked in a direction that is not perpendicular to an axis direction of the carbon fiber. Rodriguez teaches wherein the graphenes are stacked in a direction that is not perpendicular to an axis direction of the carbon fiber. (Page 3864: "the graphite

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platelets are aligned at an angle to the fiber axis”) in order to have specific electrical properties (Page 3862). Therefore, it would have been obvious to one of ordinary skill in the art to modify the carbon fibers of Deguchi to have a graphene structure that is not perpendicular to an axis direction of the carbon fiber, as disclosed by Rodriguez, in order to have specific electrical properties.

Regarding claims 41, 47, and 53, Rodriguez further teaches wherein the providing step includes processes of: arranging a plurality of catalyst particles so as to be connected to the first electrode; and growing the plurality of carbon fibers by a reaction between the plurality of catalyst particles and a gas containing carbon (Page 3864, “carbon fibers produced from the interaction powder ... with a CO/H₂ mixture”). Motivation to combine is the same as for claims 40, 46, 52, and 58 above.

Regarding claims 42, 48, and 54, Rodriguez further teaches wherein the catalyst particles contain iron (Page 3864). Motivation to combine is the same as for claims 40, 46, 52, and 58 above.

Regarding claims 43, 49, and 55, Deguchi further teaches wherein at least one or more of the carbon fibers are formed to have ends distant from a surface of the second electrode (Fig. 1A; Column 11, lines 43-45).

Regarding claims 44, 50, 56, and 59, Deguchi further teaches wherein an electron source is manufactured having a plurality of electron-emitting devices (Column 14, “Example 5”; Fig. 3).

Regarding claims 45, 51, 57, and 60, Deguchi further teaches an image forming apparatus comprising a substrate (Fig. 3,42) having a third electrode (Fig. 3,46) and a

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phosphor (Fig. 3, 44), and an electron source disposed in opposition to and spaced from the substrate (Fig. 3,43).

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kitamura et al. US 2002/0031972 A1

Xu et al. US Pat. No. 5,872,422

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne M. Hines whose telephone number is (571) 272-2285. The examiner can normally be reached on Monday through Friday from 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anne M Hines
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Art Unit 2879

AMH
8/5/05

Msy 8/7/05
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PRIMARY EXAMINER